Green Among the Concrete

The Benefits of Urban Natural Capital

A Natural Capital Project Discussion Paper

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Cover photo by Robert Roach.

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Executive Summary

Urban natural capital – everything from wild areas and water resources to soccer fields and community gardens – pays psychological, physical, and financial dividends that greatly improve the lives of urban residents and help sustain the long-term economic prosperity of our cities. We benefit from urban natural capital in a wide variety of ways including better health, greater social cohesion, richer urban cultures, cleaner air and water, more recreation opportunities, and improved urban aesthetics. Urban natural capital is also key to attracting tourism revenue and skilled labour, and increasing property values.

These benefits, however, are not well understood and public policy approaches to urban natural capital tend to be disjointed, short-sighted, and of much lower priority than other policy objectives. *Green Among the Concrete* seeks to rectify these policy shortcomings by systematically outlining the main benefits of urban natural capital. In this way, *Green Among the Concrete* challenges individuals and communities to take an inventory of urban natural capital, think differently about the natural places they use, recognize the benefits they receive from them, and to voice their opinions. It challenges environmental organizations to value urban natural capital as an important component of regional ecological networks, and municipal decision-makers to be proactive in their policies that affect natural capital and to take the actions necessary to ensure the assets are protected for future generations. It also challenges land developers to recognize the value of natural capital and design communities that maximize the benefits of natural assets.

The stock of urban natural capital should be measured, protected, and enhanced. It should not be taken for granted. Like any asset, it requires constant and long-term stewardship to ensure that its value is not only maintained, but increased. By working together, individuals, nonprofit organizations, governments and business interests can ensure that western Canada's cities are leaders in protecting and promoting urban natural capital. We all be much better off as a result.

This report highlights the importance of incorporating new forms of natural capital and the need to maintain and enhance existing stocks. This requires the use of broad range of public policy instruments – from water conservation and land use regulations to transportation planning and pollution control; it is not just a matter of building a few extra parks. In keeping with this, *Green Among the Concrete* includes the following policy recommendations:

1. Municipal governments should take more a proactive, integrated and long-range approach to urban natural capital.
2. Municipal governments should develop a two-pronged approach that seeks to protect and enhance urban natural capital in both existing communities and in new developments.
3. Municipal governments should plan for and ensure a diverse portfolio of natural capital.
4. Municipal governments should recognize and protect special forms of natural capital.
5. Municipal governments should measure their stock of natural capital and the benefits it produces.
6. Municipal governments should develop natural capital advisory committees and urban natural capital management plans.
7. Municipal governments should pursue alternative options to acquire and protect urban natural capital.
8. Municipal and provincial governments should recognize the regional role of cities.
9. Municipal and provincial governments should integrate policies across government departments.

"I firmly believe that nature brings solace in all troubles."
– Anne Frank

Introduction

The natural environment is usually associated with non-urban settings such as ranches, wild streams, camping areas, and mountain ranges. But urban areas also have – and need – "natural capital." Obvious examples of urban natural capital include parks and rivers. Add to this a city's trees, lakes, air, green spaces, scenic views, and outdoor recreation areas and you begin to see just how important natural capital is to a city and its residents. It is hard to imagine living in a city without these amenities.

Approximately 80% of Canadians live in urban areas. Urban natural capital provides residents and visitors with places to play, relax, and learn as well as beautiful things at which to look. Urban natural capital, however, does a lot more than just look good and provide urbanites with places to enjoy themselves. It also provides less obvious benefits such as habitat for wild animals and plants, improved health outcomes, and increased economic prosperity.

We use the term "natural capital" to highlight the value and utility of natural assets. Like machinery, buildings, skilled labour, and cash, natural assets such as forests, mountains, lakes, ranches, farms, and urban parks yield benefits that are key to our economic prosperity and quality of life. And, like other forms of capital, natural assets require careful stewardship and investment for their value to grow and pay dividends over the long-term. Just as we should not take other forms of capital for granted, we ignore the value of natural assets at our peril.

Despite this, urban natural capital is often taken for granted and its true value is not fully understood and not given the public policy attention that it deserves. As a result, maximizing the benefits of urban natural capital has traditionally been an afterthought of urban development and cities have been lucky to retain the natural amenities that they have.

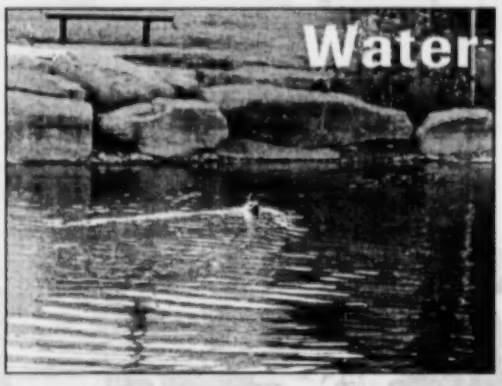
Despite the lack of proactive public policy, governments are starting to recognize the importance of urban natural capital. However, to take full advantage of its benefits and avoid the costs associated with an eroding stock of natural assets, urban natural capital needs to be better understood (and by a broader audience), more vigorously promoted, and a higher public policy priority. To help achieve these goals, *Green Among the Concrete* outlines the range of benefits generated by a city's stock of natural capital.

Urban natural capital – like other types of assets – does not look after itself; it needs careful stewardship and creative ideas for its value to grow. The alternative is to see the stock of urban natural capital shrink and for cities and their residents to suffer as a result.

figure 1

A Diverse Portfolio: Typical Urban Natural Capital Assets

- Parks
- Forests and other vegetation
- Pathways
- Community gardens
- Golf courses
- Cemeteries
- Landscaped boulevards and street trees
- Animal habitat
- Trees, shrubs, and flowers on private yards
- Outdoor recreation areas
- Roadway greens
- Scenic views
- Urban farms



- Aquatic habitat
- Rivers/streams
- Lakes
- Wetlands
- Coastal areas and beaches
- Water supply
- Scenic views

- Clean air
- Climate
- Blue sky days

Methodology

Green Among the Concrete is based on a review and analysis of literature that discusses the benefits of natural assets in urban settings. Although empirical evidence of the benefits is cited, much of the discussion of value is qualitative and difficult to quantify (e.g., aesthetic values). Therefore, this report does not attempt to quantify the individual benefits or collective value of urban natural capital. Instead, an overview of the types of urban natural capital found in western Canadian cities and the potential benefits they contribute to urban quality of life is presented. In addition, the report is not a city-by-city inventory of urban natural capital assets (e.g., number and area of parks, number of trees, area of wetlands).

What is Urban Natural Capital?

Natural capital is formed by the land, water, air and the living things and ecological cycles they support. These elements are interconnected, take a variety of forms, and span across urban, working and wild landscapes. These are things we need to live. To promote the fact that natural capital exists in our cities (albeit in a different package) and is integral to urban quality of life, *Green Among the Concrete* focuses on natural capital elements that occur within the boundaries of an urban area.

Urban natural capital comes in a variety of sizes, shapes, and styles distinct to urban landscapes. The interaction between the human environment and the natural landscape (land, water, air) creates unique forms of natural capital that go well beyond the notion of "nature in the city" (see Figure 1).

Indeed, virtually all aspects of the urban landscape have been modified by humans. Even the more "wild" areas in cities have been changed to some degree. Urban forests are reduced from their original size, wetlands are encircled by development, and recreation fields are stripped, graded and replanted with grass. Therefore, urban natural capital is a result of conscious transformation of the landscape and the introduction of artificial elements (e.g., pathways, benches, and waterfront docks).

Despite the artificial aspects of urban natural capital, it is important to remember that immediately visible forms of urban natural capital (the structures) are part of, and dependent upon, large and complex ecological *processes* that reach well beyond the urban context. Urban natural capital is, in other words, part of a regional ecological system to which it should contribute a range of

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Urban natural capital is not restricted to just public areas. Quality of life is also enhanced by the natural assets found on private lands. Although access is limited, private natural capital still benefits all residents. For example, backyard trees increase the aesthetics of a neighbourhood and contribute to our air quality. Privately owned urban natural capital includes golf courses, front and backyard trees, shrubs, and flowers, office tower rooftop gardens, and landscaped courtyards in condominium developments.

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functions (e.g., urban wetlands help maintain the quality of the water supply) and upon which it depends for its existence (e.g., an urban forest depends on the input of nutrients and water drawn from an area much larger than the forest itself). It is important, therefore, that public policy promote the ecological functions of urban natural capital such as nutrient cycling and recognize the fundamental connection between the urban natural capital assets themselves and the underlying ecological processes that support them.

The landscape across western Canada ranges from prairie to mountains and from boreal forest to coastal lowlands. Inevitably the components of natural capital will also vary. For example, Vancouver's seawall pathway offers ocean views while Edmonton's river valley pathway follows the North Saskatchewan River. What is common to all western cities is the need to maximize the benefits of the unique forms of natural capital at their disposal.

With that said, urban natural capital is unique and distinct from natural assets in working and wild landscapes. In fact, urban natural capital need not be that natural at all. Community and rooftop gardens, golf courses, cemeteries, landscaped boulevards, ski hills and street trees may not come to mind when one first thinks of urban natural capital.

Instead, urban natural capital should be viewed as a diversity of outdoor areas that range on a continuum from natural to built (see Figure 2). Urban forests, rivers, and wetlands represent the more natural components, although this capital will never be entirely natural. At the other end of the spectrum, soccer fields, playgrounds, and landscaped boulevards represent the more built components. Regardless of where they fall on the continuum, components of urban natural capital contribute to our health,

figure 2
Continuum of Urban Natural Capital

Natural **Built**

recreation and enjoyment, economic prosperity, and the ecological health of our cities. In other words, they contribute to our economic prosperity and quality of life.

Value of Urban Natural Capital

Urban natural capital supports multiple uses and generates a rich diversity of benefits that greatly enhance the lives of urban residents and visitors. It is important to stress that different forms of urban natural capital mean different things to different people. A golf enthusiast, for example, may attach more value to a golf course than a relatively undeveloped urban wilderness area, whereas a birdwatcher may have the opposite opinion. The benefits of urban natural capital also differ based on their function. For example, a wetland has greater ecological value than a baseball diamond and a pathway has greater recreational value than a street tree. The point is that there is a broad range of benefits produced by urban natural capital, and this diversity needs to be recognized and incorporated into creative and proactive urban natural capital policies.

1. Health Benefits of Urban Natural Capital

Urban natural capital directly and positively influences the health and well-being of western Canadians and indirectly affects health care costs by reducing the demand for health services. The connection between a city's natural assets and the health of urban residents is not a new argument. This connection was, for example, a reason for creating urban parks during the Victorian era in the United Kingdom (Gordon and Shirley 2002).

Physical Activity

Access to urban open spaces and the recreational activities they support encourages physical activity (Sherer 2003). People with access to nearby natural settings are healthier than individuals who have limited or no access to natural capital (Kaplan and Kaplan 1989). Therefore, the availability of urban natural capital and physical activity are directly related to the health of city residents.

Physical activity is associated with improvements to a person's overall well-being (Canadian Fitness and Lifestyle Research Institute 1996). In the short-term, an active person looks and feels healthier, has higher daily energy levels, maintains a healthy body more easily, is better able to manage stress, sleeps better, has stronger bones and muscles, and has better posture and balance (Canadian Fitness and Lifestyle Research Institute 2001). In the long-term, a physically active lifestyle reduces the risk of coronary heart disease, hypertension, stroke, diabetes, cancer, and joint pain associated with rheumatoid arthritis and knee osteoarthritis. Also, the emotional benefits of physical activity include better self-esteem and reduced likelihood of depression, anxiety and tension.

Access to natural capital is a key factor in encouraging a more active lifestyle. A lack of pleasant places to walk and/or bicycle and busy roads have been identified as barriers to physical activity in western Canada (Canadian Fitness and Lifestyle Research Institute 2001). The Centres for Disease Control and Prevention (2001) found that increasing access to urban natural capital resulted in a 25.6% increase in the number of people who exercise three or more times a week. Because not everyone wants to or can afford to go to a health club, the recreation opportunities created by urban natural capital are particularly important.

In this way, a large stock of urban natural capital facilitates more active and, in turn, healthier lifestyles that reduce the demand for health services. According to the Canadian Fitness and Lifestyle Research Institute, physical inactivity accounted for $2.1 billion of health care costs in Canada in 1999 and $150 million dollars could be saved annually if the level of physical inactivity was reduced by only 10% (Canadian Fitness and Lifestyle Research Institute 2001).

An Urban Oasis

Urban natural capital provides an escape from the hustle and bustle of city life. This break from daily routine reduces the stress associated with urban environments and generates emotional and psychological benefits for residents that improve their quality of life.

The psychological by-products of urban natural capital go beyond reducing stress and have been connected to the recovery time of hospitalized patients. Patients recover faster when they have a view of natural capital compared to those with a view of buildings and roads. Recognizing these benefits, Mount Sinai Hospital in Manhattan, New York, redesigned the hospital to maximize the number of rooms overlooking Central Park (Gordon and Shirley 2002).

Fresh Air and Clean Water

Air quality is an important factor affecting quality of life. Poor air quality is linked to a variety of health problems such as asthma and respiratory illnesses that impose direct costs on Canada's health care system and lead to premature death (approximately 5,000 premature deaths per year in Canada according to Health Canada). Other costs include lost workdays and reduced productivity (National Round Table on the Environment and the Economy 2003).

Natural capital protects and enhances air quality. Vegetation and water assets perform ecological services that reduce air pollution. Vegetation acts as a sink by removing pollutants from the atmosphere, fixing carbon and nitrogen, and absorbing low-level ozone, thereby reducing smog. Water assets (rivers, lakes, and wetlands) also have positive atmospheric effects such as the release of moisture and the removal of dust and pollutants that enhance urban air quality (Venn 2001).

Water is also critical to the health and well-being of city dwellers. Clean water is fundamental to human health and well-maintained water assets provide opportunities for recreation and, in turn, facilitate more active lifestyles.

Keeping the air clean, the water supply safe and abundant, and ensuring that there are natural spaces for recreation and mental escape are core ingredients of healthy urban lifestyles and help keep health care costs down.

2. Social Benefits

Urban natural capital provides an array of social "services" to a community that improve lives and strengthen social ties. These services include opportunities to recreate, play, gather and socialize, teach and learn, and connect community residents with the natural environment. The social goods generated by urban natural capital enhance the livability of modern cities and the quality of life for those who reside there (Chiesura 2003).

Recreation

Urban natural capital provides opportunities for outdoor recreation such as quiet walks, family outings, and games. As noted above, opportunities for outdoor recreation are linked to greater levels of physical activity that enhance the health of individuals. Outdoor recreation is also an enjoyable experience for residents that improves quality of life by providing opportunities for fun and relaxation.

The physical activity most participated in by western Canadians over the age of 20 is walking for exercise (Canadian Fitness and Lifestyle Research Institute 2001). This activity is also the most popular form of exercise for individuals aged 20 and younger. Running and bicycling are also popular activities for the under 20 age group. Access to pleasant places to walk, run, and bicycle influences the number of people participating in these activities. Walking along a busy street inhaling exhaust and walking along a picturesque river valley are very different experiences.

Natural assets in our cities provide a variety of active recreational opportunities that go beyond walking and jogging. Urban natural capital supports organized sports such as soccer, softball, and ultimate frisbee and more informal activities such as canoeing, rollerblading, and cross country skiing. Urban natural capital also supports recreation activities such as reading in the park, picnicking, photography, and bird watching.

Education

Natural capital in the urban environment encourages the educational use of outdoor space and provides an arena for environmental and nature instruction. These "living classrooms" provide opportunities for school children, the general public and researchers to learn more about the urban landscape. They also provide residents with a "wilderness" experience and connection with nature that is close to home. Adults and children can participate in naturalist and horticultural programs and nature walks/hikes. Urban natural capital also provides a "living laboratory" to conduct research on plant and animal species found within urban environments.

Social Capital

Urban natural capital provides opportunities for residents to gather and interact with family, friends, neighbours and strangers. Residents living near common open spaces engage in more social activities, feel a greater sense of community belonging, are more knowledgeable about their neighbours, and feel that their neighbours are more concerned with helping and supporting one another (Bodine Street Community Garden 2003). Public parks are places for "the meeting of strangers" where there is a possibility for strangers to interact (Thompson 2002).

Urban natural capital also provides venues for symphony performances, theatre productions, festivals, and civic celebrations. Many cities feature live outdoor theatre and art performances in parks and along waterfronts. For example, Shakespeare in the Park is held in Edmonton, Calgary, and Saskatoon, Bard on the Beach is held on Vancouver's oceanfront, and the Royal Winnipeg Ballet holds outdoor performances in Assiniboine Park.

These activities and events are dependent on urban natural capital. Without this capital, cities would lack outdoor venues to host festivals, plays, and other events. Lacking this space and the backdrop of the outdoors, many of these events would be restricted to smaller indoor venues or cancelled.

Community Gardens

Community gardens build a sense of place and community and cross boundaries of age, income and culture by bringing people together with a shared interest (MacNair 2003). These gardens provide a place for social interaction, chemical-free food production, and opportunities for community compost centres (Bodine Street Community Garden 2003). They also offer seniors, school children and other residents opportunities to interact and learn from one another (Pezzi 1998).

Gardening has been identified as the second most popular physical activity among western Canadian residents over 20 years of age (Canadian Fitness and Lifestyle Research Institute 2001). However, people living in dense inner city neighbourhoods or apartment and condominium developments have limited outdoor space. Incorporating community gardens into neighbourhoods provides opportunities for people to garden who might otherwise not have the opportunity.

Community gardens provide city residents with a connection to nature, their community, and their neighbours. Gardening is a calming activity providing an escape from the urban jungle. This type of urban natural capital is an important contributor to neighbourhood identity and quality of life.

Cultural Value

Cultural assets in the urban environment are most commonly associated with museums, art galleries, historical buildings, and music, dance, and theatre productions. However, urban natural capital also enhances the cultural and historical value of western Canadian cities.

Urban natural capital provides outdoor venues to display art and information on personal and community history, cultural identity, and heritage values (Chiesura and de Groot 2003). For example, the Grey Nuns Walkway in Winnipeg is a riverside promenade that explores the history of the francophone community. Interpretive plaques recount the history of the Grey Nuns who arrived in 1844 and founded the St. Boniface General Hospital.

Cemeteries also enrich a community's identity and connection to the past. These assets enable school children, residents, and visitors to explore and learn about a city's origins and history. In Victoria, the Pioneer Square and ocean-side Ross Bay Cemetery offer insight into the settlement of the city. Ross Bay Cemetery contains the burial sites of Emily Carr and British Columbia's first governor. This site has been designated as a Municipal Heritage Site.

In Saskatchewan, the Nutana Cemetery in Saskatoon, burial site of the city's early Temperance Colonists, and the Regina Cemetery are cultural and historical assets. The Regina Cemetery opened in 1883 as "an oasis of green in the midst of commercial and industrial growth." It is said that the history of the city and western Canada are etched on the monuments. This natural capital

asset is critical to the success of cultural and historical education tours. Regina Ethnic Pioneers Cemetery Walking Tour, Inc. was a finalist in Saskatchewan's Tourism Awards of Excellence in 1996 and 1997 and was the recipient of the City of Regina's Municipal Heritage Award Education Category (in 2000 and 2003).

3. Aesthetic Benefits

Natural capital significantly enhances how a city looks and feels. Vegetation and water features soften the hard edges of the urban environment and beautify communities. "Greening-up" the urban landscape makes residential neighbourhoods, commercial developments, and the inner city areas more desirable places to live, work, shop, recreate, and visit. Urban natural capital creates pleasurable views and vistas that compliment the built environment, offer inspiration, and maintain a connection between urban and non-urban landscapes.

A more enjoyable and pleasant pedestrian experience is created by street trees and landscaping along boulevards and in commercial developments. A view of mountains, the ocean, lakes, rivers, forests, or the downtown skyline are desired by home buyers. Property aesthetics gain further value from front and backyard trees, shrubs, flowers, and the wildlife (birds and butterflies) they attract.

Aesthetic values of urban natural capital are often taken for granted; however, few people would argue against its role in the beautification of a city (Tagtow 1990). Overall, urban natural capital enhances the aesthetic value of individual houses, condominium developments, apartments, industrial and commercial complexes and also entire communities. These values enhance the quality of place and, in turn, the quality of urban life.

Reduction of Noise Pollution

Roads, cars and trains are elements of the urban landscape. Traffic noise and exhaust fumes along busy streets and highways make adjacent neighbourhoods undesirable places to live. Municipalities construct sound attenuation walls to reduce noise pollution and to provide barriers between residential areas and roadways. These walls reduce noise pollution, but are aesthetically unpleasing.

Urban natural capital provides an alternate option to protect residential areas from traffic emissions and noise (Venn 2001). Vegetation can be used either by itself or in combination with built structures. Integrating natural capital into the urban landscape creates an aesthetic buffer between different land uses and enhances the livability of neighbourhoods and residents' quality of life.

4. Ecological Value

Urban natural capital plays a vital ecological role in cities. It absorbs atmospheric pollutants and improves air quality, reduces the "urban heat island effect," protects water quality, captures precipitation and improves drainage, provides habitat for urban wildlife, and reduces soil erosion. These benefits challenge the misconceived notion that cities are completely artificial landscapes and

ecological wastelands. Urban natural capital enhances the ecological health of western Canadian cities and the quality of life of the people who live in cities and their surrounding areas.

Air Quality

Vegetation provides cities with a natural air filter. Annually, each city tree removes approximately six kilograms of carbon dioxide from the atmosphere (Draper 2002). Since these trees are located in areas of high level emissions, urban trees are five to 15 times more beneficial than wilderness trees in terms of purifying city air (Draper 2002). As a result, "[t]rees are more than niceties, they're necessities" (Krakauer 1990).

Mircoclimate Regulation

The asphalt, concrete and tar in roads, parking lots and roofs absorb the sun's energy and radiate it as heat. This process creates urban heat islands. Heat islands are most obvious in inner city areas where the built structures dominate. Heat islands make summer city living uncomfortable, increase health problems, and add to energy costs related to air conditioning. All urban vegetation contributes to lessening the urban heat island effect (Bolund and Hunhammar 1999). These natural assets can reduce temperatures by directly by shading heat absorbing surfaces and indirectly through evapotranspiration cooling (McPherson 1994). Vegetation in urban areas is found to reduce building wall temperatures by 17°C, which reduces air conditioning use on average by 50% (McPherson 1994).

More specifically, green roofs or rooftop gardens and vertical gardens (along the sides of buildings) were promoted at the North American Heat Island Summit in 2002. These components of urban natural capital are associated with reducing building temperatures and in turn reducing fossil fuel dependency for cooling (Gatrell and Jensen 2002). What is being coined "green infrastructure" has been successful in reducing urban heat in the inner city and also in industrial areas.

Water Quantity and Quality

The built environment, dominated by concrete and asphalt, alters a city's water quantity and quality. A higher proportion of precipitation becomes surface water run-off, which reduces infiltration, increases peak flood discharge, and degrades water quality. Impervious surfaces and high levels of surface runoff affect the groundwater levels in cities – 60% of rainwater becomes runoff in non-vegetated areas compared to five to 15% in vegetated areas (Buland and Hunhammar 1999). Runoff also affects water quality. Overland pollutants from streets, garages, and parking lots are collected by runoff and dumped into receiving rivers and streams. These pollutants can affect the quality of downstream water sources for other urban areas. If a single drop of oil enters a water system, it can make up to 25 litres of water unsuitable for drinking.

Urban natural capital acts as a buffer for precipitation runoff. Natural assets capture water, increase infiltration and groundwater recharge, and filter the pollutants carried by runoff (Guglielmino 1997). For example, urban forests slow runoff and improve storage and water filtration up to 10 times over turf grass typical of sports fields. In addition, wetlands provide multiple values and ecological "services" that filter runoff and remove pollutants.

Constructed wetlands have become important components of urban natural capital. These wetlands are designed, engineered systems created to mimic a natural wetland. Constructed wetlands provide multiple values for urban areas (aesthetics, recreation, education, and habitat), but are designed to treat wastewater. In Calgary, constructed stormwater wetlands provide "storage areas" during flood events and filter non-point source pollution to protect the water quality of the Bow and Elbow Rivers. However, the benefits are not limited to ecological services. Constructed wetlands provide multiple benefits to residential communities that range from ecological services to aesthetics to habitat for urban wildlife. Collectively these benefits have made this type of natural capital desirable features in subdivision developments.

Habitat and Biodiversity

The current pattern of low-density urban development eliminates, isolates, and degrades natural habitat. This pattern also fragments regional habitat connections and movement corridors. Many species are unable to adapt to these changes which results in the loss and displacement of biodiversity. However, not all species react the same. Human disturbance and development impacts individual plant and wildlife species differently.

Habitat and urban biodiversity can be enhanced by natural capital in western Canadian cities. Ravines, woodlands, wetlands, grasslands and other vegetated areas provide important habitat for a variety of wildlife and plant species that once dominated the landscape. Within the City of Edmonton, for example, there are an estimated 580 plant, 143 nesting bird, 49 mammal, 27 fish, five amphibian, and two snake species. In the City of Saskatoon, the Saskatoon Natural Grassland Park contains over 200 species of plants and attracts over 25 species of butterflies.

Once again, cities have been lucky. Although patches of habitat and some degree of biodiversity are still present in western Canadian cities, these components of natural capital have not been the primary goals in the planning process. There is an opportunity for cities to plan better and to incorporate ecological values into long-range development plans and thereby capitalize on the values they contribute to urban quality of life and the overall quality of our cities.

5. Economic Benefits

In addition to contributing to urban quality of life in the ways outlined above, urban natural capital contributes to the vitality of the urban economy. This is seen in five areas: attracting residents and skilled labour, attracting business, attracting tourists, increasing property values, and reducing public spending.

Attracting Residents and Skilled Labour

The recreational, aesthetic and ecological benefits of urban natural capital are among the factors that individuals take into consideration when choosing their location of residence. Although it is difficult to determine exactly how important urban natural assets are in determining whether residents remain in or migrate to a city, they are clearly part of the equation. As cities and nations compete for a limited pool of skilled labour, any advantage that urban natural capital conveys is likely extremely valuable. Indeed, it is highly educated individuals who are most likely to migrate to high amenity locations (Arora, Florida, Kamlet 2000).

Attracting Business

Because businesses need skilled labour and because skilled labour is, at least in part, attracted to cities with good stocks of urban natural capital, one of the benefits of urban natural capital is its role in helping to attract footloose businesses and venture capital. In keeping with this, highly mobile industries (such as high-tech, telecom, arts and culture) tend to be influenced less by location specific production factors and more by the quality of the amenities in a specific location. Businesses that choose to locate in cities with large stocks of urban natural capital among their charms provide jobs, generate economic spin-offs and pay taxes that contribute positively to a city's economic performance and tax base.

Although not a focus of this report, natural capital assets located near urban areas play a critical role in the attractiveness of cities. Cities, therefore, have an interest in metro-adjacent natural capital as well as that lies within their borders.

Urban natural capital also supports an array of economic activity directly and indirectly related to its construction, maintenance and use (e.g., landscaping services, restaurants in or near parks, and recreation equipment rental and sales).

Attracting Tourists

One of the most valuable benefits of urban natural capital is its ability to attract tourists and the revenues they bring to a city and the jobs they support. In 2002, tourism accounted for 2.3% of Canada's GDP, reaching $22.8 billion and employment generated by tourism activities was estimated at 579,000 jobs (Industry Canada 2003). As with labour and business location decisions, urban natural capital is only one of many factors that draw tourists to a particular city, but the fact that it is a factor speaks volumes about its current and future value to a city.

Property Values

Urban natural capital has a direct positive affect on property values. Not only do the values increase for the lots directly adjacent to the capital assets, but so do the values of properties in close proximity and residential property values decrease as distance from urban natural capital increases (Mahan et al. 2000). A Canadian study found that in Surrey, B.C., parks and green space added as much as $11,000 to the value of adjacent properties (Hobden et al. 2003).

Increased property values mean greater profits for developers and municipal governments. Developers sell lots abutting or having views of urban natural capital for premium prices – thus increasing their profits. Municipal property tax is based on residential property value. If a house is worth more because of its access to natural capital, the city will collect more taxes from the owner.

The benefits of buying a house adjacent to urban natural capital also benefits the homeowner. Houses abutting or looking into areas of urban natural capital resell faster and at higher prices than similar houses lacking these amenities (Wells 2002).

Reduced Public Spending

To the degree that urban natural capital reduces the cost of public services (e.g., health care costs and water treatment and sewage treatment costs), it is beneficial as a means of curbing public expenditures and reducing pressure on taxpayers. In addition, because urban natural capital generates economic activity, is a factor in attracting skilled labour and businesses, and increasing property values, it also contributes to a broader and more lucrative tax base.

The Policy Gap

Urban natural capital is critical to urban quality of life. However, because the full range of benefits it provides is not well-understood, urban natural capital often plays second, third or even lower fiddle to other public policy priorities. As a result, urban natural capital gets a lot of lip service from decision-makers, but relatively little creative action is taken to maintain and enhance the value of our urban natural assets and the dividends they yield. Simply put, urban natural capital is not usually considered a policy priority and is often little more than an afterthought that is either taken for granted or sacrificed in the name of other objectives.

Municipal governments may respond to this by pointing out that there are numerous policies in place that require buffer zones around ecologically significant sites, encourage water conservation, restrict development in parks, and in a variety of other ways protect urban natural capital. But, this does not change the fact that we can, and should, do a lot more.

This is not meant to deny the efforts of the many dedicated people who work hard in, for example, parks departments, city water works, and planning departments; it is meant to highlight the fact that – overall – cities are not doing a good enough job of recognizing and acting on the benefits of urban natural capital. There is room to be a great deal more creative. Part of the reason for the relative lack of attention given to urban natural capital is the fact that it is difficult to quantify its benefits. As a result, municipal governments tend to focus on short-term economic benefits and squander their natural capital.

To help address the policy shortfall that characterizes current approaches to the management of urban natural capital portfolios, the Canada West Foundation has developed a provisional public policy framework to serve as the basis for a more constructive approach to building and benefiting from natural capital assets (Worbets and Berdahl 2003). The framework has six core elements:

- Recognize and celebrate natural capital;
- Measure and track natural capital provincially and locally;
- Commit to protect, manage and build natural capital through government, business, nonprofit and citizen action;
- Respect and protect dominant land uses;
- Coordinate water and land use policies and practices; and
- Identify and develop opportunities for sustainable wilderness, heritage and urban tourism.

With these six elements in mind, we put forward the following public policy recommendations:

1. Municipal governments should take more a proactive, integrated and long-range approach to urban natural capital.

Natural assets should identified and protected *before* development pressures emerge and plans for preserving natural capital should be fully integrated with infrastructure planning. Instead of looking at isolated areas within a city, decision-makers should adopt integrated approaches to urban natural capital that look at the entire city and create networks of urban natural capital as opposed to isolated patches. It is important to note here that the squandering of urban natural capital is often irreversible; once a natural asset is destroyed by development, it cannot easily be recovered or replaced. Hence the importance of proactive, integrated and long-term thinking.

2. Municipal governments should develop a two-pronged approach that seeks to protect and enhance urban natural capital in both existing communities and in new developments.

Urban natural capital policy should pay attention to more than just setting aside a small amount of natural capital in new neighbourhoods and include creative planning that enhances the quality of natural capital in both old and new neighbourhoods.

3. Municipal governments should plan for and ensure a diverse portfolio of natural capital.

Urban natural capital comes in a variety of forms that provide unique benefits. To realize the full range of health, social, cultural, ecological, and economic benefits of natural capital, cities should endeavour to create a diverse portfolio of natural assets that includes everything from relatively untouched habitat through to built structures such as rooftop community gardens. Municipalities should pay particular attention to the ecological functions of natural capital and ensure that these less visible benefits are realized (e.g., preservation of natural hydrology and nutrient cycling).

4. Municipal governments should recognize and protect special forms of natural capital.

Although all natural capital has value, some forms may be "priceless" assets that should not be destroyed in the name of competing priorities. In these cases, development should be directed away from these priceless assets and municipal governments should require alternative development options.

5. Municipal governments should measure their stock of natural capital and the benefits it produces.

For urban natural capital to garner the attention it deserves, cities need to measure their stock of natural capital, the benefits it produces, and how it is changing over time. Without this kind of information, it is too easy for other policy priorities to trump natural capital concerns. It is not, however, simply a matter of determining the dollar value of urban natural capital and its benefits and comparing this to the dollar value of competing priorities as many of the benefits of urban natural capital are difficult to translated into economic terms.

6. Municipal governments should develop natural capital advisory committees and urban natural capital management plans.

A committee comprised of representatives from government, the private sector, the nonprofit sector and the general public should be created in each city. The advisory committee would be responsible to monitor the state of urban natural capital, recommend ways to address natural capital issues, and communicate the benefits of urban natural capital. Municipal governments, in partnership with the urban natural capital advisory committees, should pursue creating urban natural capital management plans.

The plans should outline a coordinated management system and long-term strategies for the maintenance and enhancement of a city's stock of natural capital.

7. Municipal governments should pursue alternative options to acquire and protect urban natural capital.

A variety of techniques to acquire and maintain urban natural capital have been successful in the United States and, to a lesser degree, in Canada. These techniques should be researched and evaluated to determine their applicability in the Canadian context. Examples of such techniques include transfer of development rights, conservation easements, land trusts, and homeowner associations.

8. Municipal and provincial governments should recognize the regional role of cities.

Cities are interconnected with surrounding working and wild landscapes and cannot be considered isolated entities. As a result, land use and water management decisions within a city affect the regional landscape and some forms of natural capital require regional coordination. Municipal governments should seek partnerships with adjacent municipalities, their provincial government, the federal government, the nonprofit sector, and the private sector to explore ways to integrate land use and water policies.

Water is a good example as many communities rely on the same resource. Cities require both water demand management and water quality management to ensure that they are not degrading resources for downstream users. Also, the development of cities alters the hydrology of watersheds that affect large areas beyond city boundaries.

9. Municipal and provincial governments should integrate policies across government departments.

Urban natural capital is relevant to a broad range of government departments. Even within a municipal government, transportation, land use, water, and parks are usually divided into separate units. There needs to be greater integration among these silos to ensure that urban natural capital policies are consistent and are incorporated in all municipal decisions. Also, integration should be sought between the various levels of government to ensure that municipal, provincial, and federal governments are working together to develop proactive policies. Integrating the levels of government should also strive to develop a coordinated approach to urban natural capital policy.

Conclusion

Urban natural capital such as parks, trees, clean air, rivers, stunning vistas, community gardens, and wetlands produce a wide range of benefits. Despite this, urban natural capital often takes a backseat to other concerns and urban quality of life suffers as a result. By outlining the many benefits of urban natural capital, this report is designed to stimulate debate about the importance of natural capital in the urban setting and how to ensure that public policy takes full advantage of what urban natural capital has to offer. Even in areas where the benefits are clear, such as clean air and a safe and abundant supply of water, public policy often falls short - as pollution caused by urban traffic and the damage caused to watersheds by urban development attest. In the instances where the benefits of urban natural capital are harder to measure or where there is less agreement about its importance, such as aesthetic value and the need to preserve habitat, public policy is almost silent. Overall, we need to do a better job of understanding and addressing the tradeoffs in this area of public policy. If we do, our cities will be better places to live.

It is also important to recognize that urban natural capital comes in a wide variety of forms and is more than just green space. Municipal governments need to recognize this diversity and use it as a foundation to develop urban natural capital policies. Finding ways to take advantage of green infrastructure, facilitating the creation and use of community gardens, and ensuring that housing projects for both the disadvantaged and the wealthy alike incorporate nature into their designs are examples of areas where creative public policy can make a significant positive difference.

Urban natural capital cannot take care of itself; it requires careful management to ensure that it grows and that its quality is maintained and enhanced for future generations. Urban natural assets are not just pretty things to look at; they are sources of economic growth and prosperity and key determinants of our quality of life. Urban natural capital is something that cities simply cannot afford to waste.

Overall, we have to do a lot more than build a few extra parks, leave a few extra metres of green space here and there and protect the odd patch of wetland. We have to consider the long-term costs and benefits of current models of development on both the edge of cities and within existing residential and commercial neighbourhoods. We have to break the stranglehold short-term considerations and quick payoffs have on policy in this area. The sad part is that there are workable alternatives, but they – like the land itself – are bulldozed by short-term thinking.

We do not have to chew up prime farmland or pristine wilderness to make room for new residents and businesses. And where we do use farmland and wild areas, there are better methods than those currently in use to preserve their natural features and the benefits those features produce. Plus, there are things that can be done in areas other than land use – such as better public transit systems that decrease pollution and the need for roads and parking lots, xeriscape landscaping techniques that improve water conservation, and creative financing options and partnerships designed to maintain and improve existing natural assets.

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IDEAS

2004 has the potential to be a year of great change in Canada: there will be a federal election, the future of our cities is a hot topic, Canada-US relations are evolving, and the nature of our democracy is being debated.

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